Abstract

Certain drugs used to treat infectious diseases and cancers cause ototoxic hearing loss. Ototoxicity monitoring determines whether hearing has changed from pre-exposure measures, so treatment changes can be considered that would minimize further loss. The American Speech-Language-Hearing Association (ASHA) recommended decision variables (threshold shifts at one or more frequencies) and criterion cut-offs (dB changes) for determining whether a significant threshold shift (STS) has occurred. Controversy remains about what STS definitions, test frequencies, and frequency step sizes should be used. We determined test performance for these variables using clinical decision theory. Serial audiometric data were analyzed from patients receiving cisplatin (78 ears) or non-ototoxic antibiotics (53 ears). Threshold shifts within an octave of patients' high-frequency hearing limit were evaluated. For the 1/2-octave step size used clinically, best performance was achieved for threshold losses of 15dB at a single frequency, a change present in 50% of ears by completion of cisplatin therapy. ASHA STS definitions (threshold shifts of 20dB at 1 frequency and 10dB at 2 or more adjacent frequencies) also performed well, resulting in true positive rates of 36% and 39%, respectively. Best test performance was obtained using 1/6-octave steps and a criterion cutt-off of 10dB at 2 or more frequencies.